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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,849	01/10/2002	Michael Stuart Weaver	UDC-20101	1152

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EXAMINER
LEURIG, SHARLENE L

ART UNIT	PAPER NUMBER
2879	

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/043,849	WEAVER ET AL.	
	Examiner	Art Unit	
	Sharlene Leurig	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 19-27* is/are rejected.

7)☒ Claim(s) *10-18 and 28-30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on March 13, 2002 cannot be located in the file wrapper. Additionally, there are indications on the file wrapper of an IDS sent in between January 10, 2002 and March 13, 2002, but no date is specified and there is no additional IDS identified as paper number 3 located in the file wrapper. If the two IDS sheets mentioned above include references other than the references cited on the IDS filed on January 10, 2002 (paper number 2), a copy of which is included in this action, please send those references with the applicant's next communication.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: it is unclear whether the "one or more polymeric planarizing sublayers", including the one in which "microparticles are incorporated", is identical to the polymeric layer claimed in claim 1, or whether the sublayers are in addition to the polymeric layer claimed in claim 1. For the purposes of examination, and after review of the specification and Figure 3, the claim will be interpreted as meaning that the polymeric planarizing sublayer containing

the microparticles is the same as the polymeric layer containing microparticles described in claim 1, and that this polymeric layer is now considered to be part of the composite barrier layer of the dependent claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-9 and 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duggal et al. (US 2001/0033135 A1) in view of applicant's admission of the prior art.

Regarding claim 1, Duggal discloses an OLED device comprising a substrate (Figure 1, element 5), an active region (1) adjoining the substrate, the active region comprising an anode layer, a cathode layer and a light-emitting layer disposed between the anode and the cathode (page 4, paragraph 0049, lines 6-8), and a polymeric layer (page 3, paragraph 0033, lines 13-14) disposed over the active region, the polymeric layer (3) containing microparticles (page 3, paragraph 0035, lines 4-6) intended to increase the out-coupling efficiency of the OLED (page 3, paragraph 0033, lines 2-4).

Duggal lacks an active layer formed over the substrate, since the disclosed device is a top-emitting OLED.

The applicant's admission of the prior art teaches a variety of well-known OLEDs, including both top-emitting OLEDs and bottom-emitting OLEDs. In the bottom-emitting OLEDs the active region is formed over the substrate (page 3, paragraph 0010; Figure 1A).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Duggal's OLED with an active region formed over the substrate in the event that a bottom-emitting OLED was preferred for the type of display being constructed.

Regarding claim 2, Duggal discloses a substrate comprising an inorganic material or an organic material, such as glass or plastic (page 4, paragraph 0049, lines 11-12).

Regarding claim 3, Duggal discloses a transparent substrate (page 4, paragraph 0049, line 12).

Regarding claim 4, Duggal discloses a substrate made of glass (page 4, paragraph 0049, lines 11-12).

Regarding claim 5, Duggal discloses a substrate made of a polymeric material, such as plastic (page 4, paragraph 0049, lines 11-12).

Regarding claim 6, Duggal lacks disclosure of a substrate made of a flexible polymeric material.

The applicant's admission of the prior art teaches flexible OLEDs having flexible substrates formed of polymeric material.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Duggal's OLED with a flexible substrate made of polymeric material that can be used to create novel flexible displays to meet consumer demand.

Regarding claim 7, Duggal discloses a substrate comprising a polymeric material such as a polycarbonate (page 4, paragraph 0049, lines 12-13).

Regarding claim 8, Duggal discloses a polymeric layer (3) containing microparticles that is disposed on a top surface of the substrate.

Regarding claim 9, the substrate comprises glass (page 4, paragraph 0049, lines 11-12).

Regarding claim 21, Duggal discloses microparticles comprising a transparent inorganic material (page 3, paragraph 0035, lines 4-6). Though Duggal does not use the word "transparent", the disclosure that the microparticles have the same index of refraction of the adjacent layer of the device, which must be transparent to allow the emitted light to pass through, means that the microparticles themselves must be transparent to light.

Regarding claim 22, Duggal discloses microparticles comprised of glass, such as SiO_2, which is silica glass (page 3, paragraph 0036, lines 1-5).

Regarding claims 23 and 24, Duggal discloses microparticles comprising metal oxide such as TiO_2 (page 3, paragraph 0036, lines 1-3).

Regarding claim 25, Duggal discloses microparticles comprising a polymeric layer having a refractive index of 1.9 (page 11, paragraph 0109, line 14-16). Duggal discloses the polymer having a refractive index in the range of 1.6 to 1.65 (page 3,

paragraph 0033, lines 13-17) and the total refractive index of the polymer material with the microparticles being "adjusted between the values of the pure polymer (or glass) and the pure filler (i.e., the nanoparticles)" (page 4, lines 1-3). Since the composite refractive index of the layer can be as high as 1.9 and the polymer material has a lower refractive index than that, the refractive index of the microparticles must be higher than 1.9, and thus must be within the claimed range of 1.7 or greater.

Regarding claim 26, the refractive index of the microparticles is different from the refractive index of the polymeric layer (page 4, paragraph 0039, lines 1-3).

Regarding claim 27, the difference between the refractive index of the microparticles and the polymer must be greater than 0.3, according to the reasoning discussed above in relation to claim 25.

6. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duggal et al. (US 2001/0033135 A1) in view of applicant's admission of the prior art as applied to claim 1 above, and further in view of Fork (6,339,289).

Duggal discloses an OLED with all the limitations discussed above, including microparticles with mean particle size of 100 nanometers or less (10 microns) (page 3, paragraph 0036, lines 7-10).

Duggal lacks disclosure of an OLED where the active region is formed over the substrate.

The applicant's admission of the prior art teaches OLEDs with the active region formed either over or under the substrate, depending on the type of OLED desired.

Both Duggal and the applicant's admission of the prior art lack disclosure of the size of the pixels of the OLED.

Fork teaches an OLED with pixels that are 300 microns across (column 5, line 9) as part of an OLED designed to prevent dark spots and thereby improve imaging.

Regarding claim 19, when such a pixel size is combined with the microparticle size disclosed by Duggal, the microparticles are smaller than the smallest lateral dimension of the pixels combination.

Regarding claim 20, the pixel size taught by Fork fits within the claimed pixel size range of 10 microns to 300 microns, and the microparticle size disclosed by Duggal fits within the claimed microparticle size range of 0.4 microns to 10 microns.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Duggal's OLED with pixels that are 300 microns across to provide a display with improved imaging, as taught by Fork, and thereby provide pixels that are larger than the microparticles contained in the polymeric layer.

Allowable Subject Matter

7. Claims 10-18 and 28-30 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: The Examiner notes that the Prior Art of Record, Duggal et al. (US 2001/0033135 A1) discloses an OLED with a polymeric layer containing microparticles

that increase the out-coupling efficiency of the OLED. Duggal further discloses a protective layer (Figure 9, element 150) formed underneath the active region, designed to shield the device from elements such as oxygen and water.

Regarding claim 10, the references of the Prior Art of record fail to teach or suggest the combination of the limitations as set forth in claim 10, and specifically comprising the limitation of a composite barrier layer having a polymeric planarizing sublayer containing microparticles. Duggal discloses a protective layer formed on the opposite side of the device to shield the device from the elements, but does not disclose this layer being provided adjacent to the polymeric, microparticle-containing layer.

Conclusion

The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure. If the applicant wishes to review a former patent on phosphors serving as microparticles embedded in a polymer layer, USPN 5,955,837 to Horikx et al., particularly column 5, lines 6-7, is cited of interest.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharlene Leurig whose telephone number is (703)305-4745. The examiner can normally be reached on Monday through Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703)305-4794. The fax phone numbers

for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Sharlene Leurig
June 9, 2003